

## **REMARKS**

The Office action, dated as mailed May 18, 2005, addressed claims 1-10. Claims 1-10 were rejected under 35 USC §103(a). In response, claim 1 is amended above to more particularly point out and distinctly claim Applicants' invention and claim 9 has been canceled without prejudice to the subject matter contained therein. Accordingly, claims 1-8 and 10 remain pending in the present application.

Prior to responding to the substance of the Office action, it is useful to recapitulate the invention as claimed.

### **The Claimed Invention**

As illustrated in Figures 1 through 3, the claimed invention contemplates a low profile antenna that comprises a fractal pattern antenna (12) being generally planar in configuration and extending in a first direction and a ground plane structure (14) operatively associated with the antenna. The ground plane structure comprises a generally planar surface (18) that extends in a direction that is generally parallel to the first direction, at least one protrusion (20) extending from the planar surface and a dielectric substrate (22) supported by the planar surface. The dielectric substrate comprises a ferrimagnetic material that has a relative permeability ( $\mu$ ) of greater than or equal to about one and a relative permittivity ( $\epsilon$ ) of greater than or equal to about one. Such a low profile antenna has been found to reduce surface waves while not compromising

bandwidth evident in prior art antennas (see Applicants' specification page 2, lines 14-19).

### **The Rejection of Claims 1-10 Under 35 USC §103(a)**

Claims 1-10 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,525,691 to Varadan et al (below referred to as "Varadan") in view of U.S. Patent No. 6,483,481, to Sievenpiper et al (below referred to as "Sievenpiper"). However, Applicants respectfully traverse the rejection as neither Varadan nor Sievenpiper teach or suggest a fractal pattern antenna and a ground plane structure comprising a dielectric substrate supported by the planar surface that comprises a ferrimagnetic material, as defined by Applicants' independent claim 1, nor do either, alone or in combination, teach or suggest a fractal pattern antenna being generally planar in configuration and extending in a first direction and a ground plane structure comprising a generally planar surface that extends in a direction that is generally parallel to the first direction as now defined by Applicants' independent claim 1.

Also, Applicants have an earlier invention date than the earliest possible filing date of Varadan of June 28, 2000 and the filing date of November 14, 2000 of Sievenpiper and thus would file a 37 CFR §131 Declaration to swear behind both of these patents should the Examiner choose to employ either in a subsequent action. Because of the above amendment to claim 1 and the below discussion it is believed that, at this time, it is not necessary to provide such a Declaration, but, Applicants reserve the right to do so at a future juncture.

Varadan

Referring to Figure 5A, Varadan describes a fractal pattern antenna 60 that has a substrate 22 and a ground plane consisting of a sheet of highly conductive material 26. The substrate 22 consists of a GI epoxy, plexiglass, alumina or a ferroelectric material, i.e., barium strontium titanate (see col. 5, lines 59-65 and col. 6, lines 14-20). Figure 5A shows that the antenna 60 is disposed in a generally perpendicular direction to that of the ground plane 26.

Sievenpiper

Referring to Figures 1 and 2a, Sievenpiper describes a high impedance surface consisting of an array of top elements 10, 20 disposed on a substrate 16. The top elements 10 are connected to a ground plane 12 by vias 14, 15. The substrate 16 is stated to be a circuit board composition, in particular, Duroid 5880 (see col. 4, lines 53-55).

Discussion

Applicants respectfully submit that independent claim 1 is patentable over the combination of Varadan and Sievenpiper as neither of these patents teach or suggest Applicants' claimed invention including a fractal pattern antenna and a ground plane structure comprising a dielectric substrate supported by the planar surface that comprises a ferrimagnetic material. Instead, Varadan teaches a dielectric substrate that includes a GI epoxy, plexiglass, alumina or a ferroelectric

material, i.e., barium strontium titanate and Sievenpiper discloses a circuit board composition. Therefore, neither Varadan nor Sievenpiper alone or any combination thereof renders obvious Applicants' claim 1.

Also, it is respectfully submitted that a ferrimagnetic material, as known by those of ordinary skill in the art, is a much different material than that of a ferroelectric material as taught by Varadan. A ferrimagnetic material is a material that "...when, first, all moments on a given sublattice point in a single direction and, second, the resultant moments of the sublattices lie parallel or antiparallel to one another." (McGraw-Hill Concise Encyclopedia of Scientce & Technology", Second Edition, Sybil P. Parker, 1989, p. 764, **See Attachment A**). Examples of ferrimagnetic materials include magnesium ferrite and magnetite. In contrast, a ferroelectric material is a crystalline substance which has a permanent spontaneous electric polarization (electric dipole moment per cubic centimeter) that can be reversed by an electric field. (McGraw-Hill Concise Encyclopedia of Scientce & Technology", Second Edition, Sybil P. Parker, 1989, p. 765, **See Attachment A**). Examples of ferroelectric materials include barium strontium titanate, monobasic potassium phosphate and ammonium sulfate. Therefore, Varadan teaches away from a ferrimagnetic material thus does not render obvious Applicants' claim 1.

Further, Varadan teaches away from a fractal pattern antenna being generally planar in configuration and extending in a first direction and a ground plane structure comprising a generally planar surface that extends in a direction that is generally parallel to the first direction as defined in Applicants'

independent claim 1. In contrast, Varadan teaches that the antenna 60 should be disposed in a generally perpendicular direction to that of the ground plane 26 as shown in Figure 5A. Accordingly, Varadan alone or in any combination with Sievenpiper would not replicate Applicants' invention as recited in claim 1.

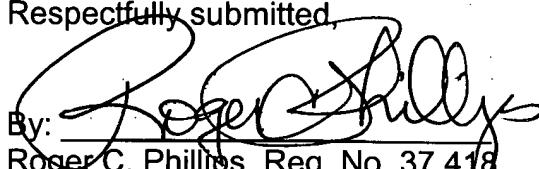
Regarding each of claims 2-8 and 10, since each of these claims depend from what now should be allowable independent claim 1, each of these claims should also be allowable for the reasons provided above.

### **Conclusion**

In view of the foregoing, Applicants respectfully request reexamination, reconsideration and allowance of each of pending claims 1 through 10.

The undersigned attorney may be contacted at the number below to facilitate the resolution of any remaining matters.

Respectfully submitted,

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